

Election/Restriction

As noted above, claims 45, 47-49, 51, 60 and 61 are presently withdrawn from consideration due to the restriction requirement made final in the Office Action. In the Office Action, when discussing the reason for not accepting the traverse as persuasive, the Examiner stated that “the method of claim 45 further distinguishes it self as a process which can be used to make other and materially different product that does not require machining the cylindrical to provide at least one integral retaining groove.” Reconsideration and removal of the requirement is once again respectfully requested because claim 45 positively recites a step of “machining the cylindrical body to provide at least one integral retaining groove” and therefore would clearly result in a product including “at least one integral retaining groove.” In the alternative, a further clarification of the Examiner’s reasoning is respectfully requested. Applicant also requests a clarification of status relating to the earlier required election of species.

Claim Rejections – 35 U.S.C. § 103

Ungerman in view of Leimbacher

In the Office Action claims 1-3, 6, 7, 14, 15, 18, 19, 21-24, 26, 28, 52, 54, 55, and 57 were rejected under 35 U.S.C. § 103 as obvious over the Ungerman et al. reference, US 5,868,443 (“Ungerman”) in view of the Leimbacher et al. reference US 5,837,181 (“Leimbacher”). Ungerman discloses an interlocking system between two pipes to be connected within a tubular fitting member. The interlocking system includes male and female portions that mechanically mesh together to form binding contact between the pipes to reduce individual rotation of the pipes relative to one another. Figure 5 shows the interlocking system between the

two pipes and Figure 2 shows a longitudinal cross-section of the tubular fitting member. Ungerman also discloses the CERTA-LOK™ system of CertainTeed Corporation for providing a restrained joint connecting two PVC pipes with annular cavities with polymeric dowels inserted into a connector having matching annular cavities. Ungerman explains his invention as using a CERTA-LOK™ type system with male and female pipe ends to limit or prevent rotation of the pipes with respect to each other. Although Ungerman discloses that the pipes of both the prior art CERTA-LOK™ system and his newer anti-rotation pipe joint employing a CERTA-LOK™-type system are formed of PVC, he does not disclose the material composition of the tubular fitting member # 30. Ungerman discloses, at column 1, line 37 pressures of 150 psi and up. Ungerman, however, does not disclose a pipe diameter. The current inventor realized after considerable experimentation that with much larger diameter pipes and accompanying larger couplers of the CERTA-LOK™ type, simple size increases in couplers were ineffective to deal with high pressures. (Note in particular the discussion in the background of the present invention on pages 2-5 of the application.)

The Examiner recognizes that Ungerman fails to disclose plural concentrically arranged layers of wound filaments in thermoset plastic matrix, each layer characterized by a winding angle opposing the winding angle of adjoining layers. Leimbacher discloses thermoplastically formable composite materials based on polyamide 12 matrix. Leimbacher discloses a liquid penetrated fiber arrangement, formed in a mold or tool, then polymerized with temperature and pressure to produce a shaped body of his composite material. The shaped bodies can be used to produce pipes for transporting media. Leimbacher teaches, at column 1, lines 29-32 that traditional thermoset plastic matrix systems, such as those using epoxy or polyester matrices, are

less desirable because they result in parts that cannot be subsequently reshaped. He teaches, at column 3, lines 17-21 that oriented fiber arrangements, in particular continuous fibers (filaments) and a matrix of polyamide 12, are the subject of his invention, and may be reshaped by heating. E-glass fibers, carbon fibers, aromatic polyamide fibers, and hemp or flax are all disclosed, at column 3, lines 26-30 and at column 5, lines 18-26, as suitable fibers for his heat reshapeable composites. Methods of providing structure by means of a parallel placement process, or weaving, knitting, plaiting, winding or embroidery process or combinations thereof are disclosed at column 3, lines 34-39. Pultrusion, resin transfer molding, structural resin injection molding, and rotomolding processes are also disclosed at column 3, lines 23-25. Leimbacher also discloses, at column 4, lines 47-55, that to produce fiber-reinforced hollow bodies a knitted fiber fabric or knitwear or embroidered article or woven fabric or combination is first placed in a modified-rotomold then the resin impregnates the fiber arrangement during rotation. Such a teaching of producing hollow body shapes by modified rotomolding would appear to teach away from the inventive coupling recited in claim 1 since the teaching typically involves knitwear and modified rotomolding and does not produce a wound filament composite coupling. Moreover, a layered laminate of wound layers of opposing angled filaments is not disclosed in Leimbacher. One of ordinary skill would not have been led to modify Ungerman's tubular fitting member # 30 by employing the disclosure of Leimbacher to make the composite coupling of claim 1 of the present invention.

Leimbacher's teaching at column 4, lines 47-55, that hollow bodies are made by modified rotomolding with knitwear pre-positioned in the rotomold would have led one of ordinary skill away from winding layers of opposing angles. While winding is generically mentioned at

column 3, line 36, and while a 6 layer laminate of woven material is made in one of the examples, winding concentric layers of opposed winding angles is not mentioned and thus would not have led one of ordinary skill to an article of claim 1. Finally, it should also be pointed out that while Leimbacher discloses composites are used to reduce weight and deal with high acceleration forces at column 1, lines 12-20, dealing with high pressures when coupling pipes is NOT mentioned. Moreover, the pipes to be joined in the present invention are adequate at high pressures, but it is the coupling which represented the problem prior to the Applicant's invention. Leimbacher's disclosure concerning weight, acceleration forces, and pipes would not have lead one of ordinary skill to consider his composites in achieving the coupling of the present invention. Reconsideration and allowance is respectfully requested.

Claims 2, 3, 6, 7, 14, 15, 18, 19, 21-24, 26 and 28 all depend from claim 1 and therefore are logically also nonobvious relative to the combination of references Ungerman in view of Leimbacher. More specifically, as with claim 1, the combination of Ungerman in view of Leimbacher does not teach nor suggest a coupler with a plurality of concentrically arranged layers of wound filaments in a thermoset plastic resin matrix, each of the layers being characterized by a winding angle opposing the winding angle of the adjoining layers. Reconsideration and allowance of these dependent claims is also respectfully requested. While the dependency of these claims alone from a nonobvious independent claim is sufficient for their allowance relative to Ungerman in view of Leimbacher, some of the Examiner's statements with respect to specific claims also mischaracterize the references and therefore warrant correction for the record.

With respect to claims 6 – 9, the Ungerman reference lacks a pipe stop. For that reason, Applicant's Attorney questions the characterization of Ungerman as disclosing any "means for indexing." Ungerman does teach, at column 3, lines 26-31, that pipes are inserted until their recesses 51 and 52 approximately match the inner annular recesses 41 and 42 and that one or more splines 36 and 37 can be inserted into through-holes 32 and 34. Ungerman teaching is merely a trial and error system of repetitively attempting to establish a locking relationship until the parts are adequately approximately aligned. A "means for indexing" would more reasonably include an active means for indexing so as to facilitate and promote and achieve appropriate alignment. Reconsideration and allowance of claims 6-9 with respect to Ungerman in view of Leimbacher is respectfully requested.

With respect to claim 14, Ungerman does not disclose a tangential orientation of a port. Through-holes 32 and 34 appear to be radially oriented and not tangentially oriented. Careful observation of the longitudinal cross-sectional view of Figure 2 at through-holes 32 and 34 clearly conveys the visual impression that the through-holes have a radial orientation. Figure 2 also shows, but does not discuss nor provide any reference numbers for additional detail in Figure 2 where the through-holes 32 and 34 adjoin the annular recesses 41 and 42. It would appear to Applicant's Attorney that the additional detail merely reflects the intersection of radially oriented through-holes with the circumferential annular recesses 41 and 42 and that such additional detail should not be misinterpreted to represent or suggest the disclosure or teaching of any tangential aspect to the through-holes of Ungerman. It is respectfully submitted that neither such drawing detail nor the remainder of the reference would not have led one of ordinary skill

to reorient the through-holes of Ungerman to a tangential orientation. Reconsideration and allowance of claim 14 is respectfully requested.

With respect to claims 18, 19, 21, 23 and 24 Leimbacher only generically mentions winding at column 3, line 36. The Examiner incorrectly begins his explanation by stating that the claimed invention is disclosed by the combination of references, but for a few exceptions. Leimbacher does disclose a laminate with six layers (noting column 8, lines 53 – 54) but the Leimbacher laminate is based upon a twill weave of glass fiber (noting column 8, lines 8) and the twill weave was pretreated by sprinkling with powder mix for eventually forming a matrix (noting column 8, line 39.) Such disclosures would not have led one of ordinary skill to the far more specific winding details recited in claims 18, 19, 21, 23 and 24. Winding angles, numbers of concentric wound layers are not disclosed in these references. Clearly, one of ordinary skill in the art must have a sufficient starting point design before the “optimization” of the design, as suggested by the Examiner, can occur and therefore be within the skill of the art. In the present situation, a sufficient starting point design is not presented from within the Ungerman and Leimbacher reference combination and therefore these claims logically represent far more than “optimization” of proportions as might be within the skill of the art. Reconsideration and allowance of claims 18, 19, 21, 23 and 24 is respectfully requested..

With respect to claim 22 the recited 16 inch outer diameter is recognized by the Examiner as lacking from the disclosure of the references. The Examiner then incorrectly concludes that this is merely a size modification. The coupling of the present invention represents more than a mere size modification. At approximately 16 in outer diameter the coupling requires more than a

size selection. As explained in the background of the invention from pages 2 -5, extrusion of PVC based couplings of sufficient strength becomes difficult or impossible as size increases. Either the extrusion of PVC coupling walls becomes so thick as to be problematic or alternatively a PVC coupling wall of insufficient strength results. Thus, investigation of pressure limitations of the couplings resulting from mere size modification, for example pipes capable of 200 psi being used in pipe systems which had to be derated to 90 psi, challenged the inventor to discover the novel invention being claimed. Clearly, as noted in the specification, this invention is far different than a mere change in size. Reconsideration and allowance are respectfully requested.

With respect to independent claim 52, Applicant's Attorney respectfully disagrees with the Examiner's characterization of the combination of references, Ungerman in view of Leimbacher, as disclosing a filament wound composite coupling. The Examiner has assumed that Ungerman's coupling is a composite and that one of ordinary skill would be led by Ungerman to look to Leimbacher for a filament wound composite to substitute into Ungerman's disclosure in order to replace Ungerman's coupling. Applicant's attorney respectfully submits that one of ordinary skill would not be led to modify Ungerman in such a manner since no motivation is present. The inventor has recognized a new problem, the need for an improved material in the coupling. Leimbacher suggests usefulness of fiber composites in pipes, not in couplings, and suggests that problems of weight and acceleration can be dealt with, not problems of high pressure in couplings. Leimbacher suggests usefulness of fiber composites in winding processes but there remains the problem that the need for a fiber wound composite coupling was previously unrecognized in this field. Reconsideration and allowance are respectfully requested.

With respect to claim 55, it respectfully submitted that merely inserting pipes until the recesses are approximately matched, as taught by Ungerman, at column 3, lines 26-31, appears to be merely a trial and error system of repeatedly attempting to establish a lock until successfully approximately aligned rather than any active means for indexing to facilitate establishing coincident relationships ready for a locking of a pipe to a coupling. More specifically, where is the facilitation effect of the trial and error method of Ungerman? Reconsideration and allowance of this claim with respect to Ungerman in view of Leimbacher is respectfully requested.

Independent claim 57 is directed to a pipe system having, in part, a filament-wound composite coupling. In the Office Action, the Examiner incorrectly indicates that the reference combination of Ungerman in view of Leimbacher discloses such a system. Again, Ungerman does not disclose the material composition of his tubular fitting member 30, but does indicate that it is of a CERTA-LOK™ type system. Such a system is disclosed as connecting PVC pipe. Unless described otherwise, the Ungerman tubular fitting member 30 might be looked upon as a tubular fitting of PVC. No suggestion nor motivation is present in the combination of references, Ungerman in view of Leimbacher, to use a filament wound composite material in the tubular fitting member 30. Reconsideration and allowance is respectfully requested.

Dole in view of Leimbacher

In the Office Action claims 1-3, 6-9, 14, 15, 18, 19, 21-24, 26 and 28-30 were rejected over the Dole et al reference, US 5,758,909 ("Dole") in view of the Leimbacher et al reference, US 5,837,181 ("Leimbacher"). The Examiner describes Dole as disclosing a composite coupling

(12) for use in a restrained joint between two pipes. The Examiner identifies a first retainer groove (28) interior to the coupling (12). The Examiner recognized that Dole fails to disclose that the coupling body is concentrically arranged layers of wound filaments in a thermoset plastic matrix, each layer characterized by a winding angle opposing the winding angle of adjoining layers. The Examiner then incorrectly characterizes Leimbacher as teaching a plurality of concentrically arranged layers of wound filaments in a thermoset plastic matrix, each of the layers characterized by a winding angle opposing the winding angle of the adjoining layers, to produce pipes and protective coverings. In fact, Leimbacher does not disclose wound layers characterized by any particular arrangement of winding angles nor how to make a coupling, Leimbacher only discloses winding as one possible process which might employ his composite and discloses pipes and protective coverings as possible products. One of ordinary skill would not be led by the proposed combination of references because Leimbacher teaches the use of composites to reduce weight and dealt with high acceleration situations. Further, Leimbacher's examples use twill weavings not wound filaments. Reconsideration and allowance of claim 1 is respectfully requested.

Claims 2, 3, 6-9, 14, 15, 18, 19, 21-24, 26 and 28-30 depend from claim 1. If claim 1 is nonobvious relative to the reference combination Dole in view of Leimbacher, as explained above, then the claims depending from claim 1 logically are also nonobvious. However, specific comments and characterizations of the references relating to certain dependent claims are also not correct. Therefore, additional responsive comments to the comments of the Office Action are provided as follows.

With respect to claim 14, Dole's disclosure of a tangential port is not observed. Dole shows a slot rather than a through-hole and does not use a spline. Reconsideration and allowance is respectfully requested.

With respect to claims 18, 19, 21, 23 and 24 the Examiner recognizes the absence of disclosure relating to winding angle, number of layers, and opposing winding angles, but reasons that such details are only optimization within the skill of the art. However, it is respectfully submitted that optimization first requires that the basic structure, ready to be optimized, exist within the prior art. In the present invention, the combination of references, Dole in view of Leimbacher, fail to disclose plural wound layers. Absent such plural wound layers, one of ordinary skill has a greater task to accomplish than mere optimization. First, one of ordinary skill would need to appreciate the desirability of modifying the Dole "coupler 12" and substituting a layered wound filament composite structure. However, the references also lack motivation or suggestion leading to such substitution. Reconsideration and allowance are respectfully requested.

Similarly, with respect to claim 22, the Examiner proposes that a change in size is within the skill in the art. However, it is again pointed out that the present invention is more than a change in size, but rather requires the initial starting point of a layered wound filament composite coupler, where the layers have opposed winding angles. Layered wound filament winding angles with opposing winding angles relative to adjoining angles is neither disclosed nor suggested by the Dole in view of Leimbacher reference combination. Absent such a starting

structure, a change in size is not possible. Reconsideration and allowance is respectfully requested.

With respect to claims 29 and 30, a snap ring is not disclosed in the Dole reference. A central abutment (pipe stop) 20 is shown in Figures 2, 3, 15 - 19 (noting column 5, lines 4-9.) The central abutment 20, as shown in the longitudinal cross sectional views, is depicted as continuous with the body and not as a snap ring. A snap ring is not disclosed. Absent any suggestion to employ a snap ring or bond such, one of ordinary skill would not be led to such a feature. Reconsideration and allowance is respectfully requested.

It is respectfully submitted that the remaining claims are now in condition for allowance and a notice of allowance is requested. If there are issues yet to be resolved to advance the prosecution of this patent application to issue, the Examiner is requested to telephone the undersigned counsel.

Respectfully submitted,

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